EFV Open Systems Review

Brief to the Modular Systems Approach Review Team

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EFV-C

EFV-P

Purpose

- Present an overview of the operational view and programmatic schedule for the EFV program.
- Present the EFV program's incorporation of an open systems architectural approach.
- Present EFV findings and recommendations given to OUSD AT&L (Open Systems Team) on the MOSA PART and process.

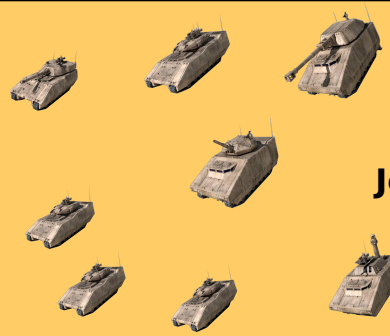
EFV-P MISSION

Provide High Speed Transport of Embarked Marine Infantry From Ships Located Beyond the Horizon to Inland Objectives

Provide Armor Protected Land Mobility and Direct Fire Support During Combat Operations

EFV- C Mission

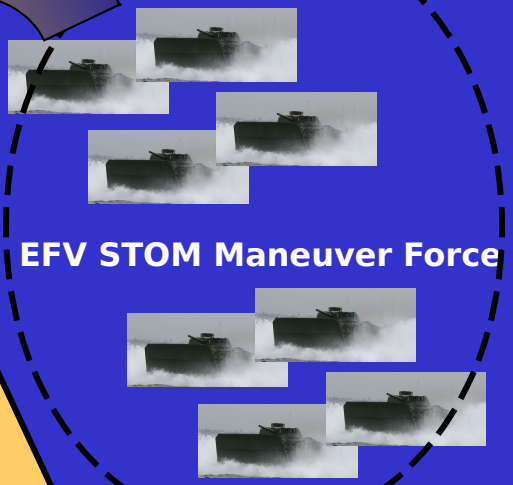
- **The EFV - C shall enable the embarked Infantry Battalion and/or Regimental Commander and his staff members to function as an Infantry Battalion or Regimental Tactical Echelon Command Post while on the move.**



Joint/Allied

CAS

LPP 3



EFV STOM Maneuver Force

PCS

CATF/CLF

NSFS

EFV SOA Force

LPP 2

NEF
OBJ A

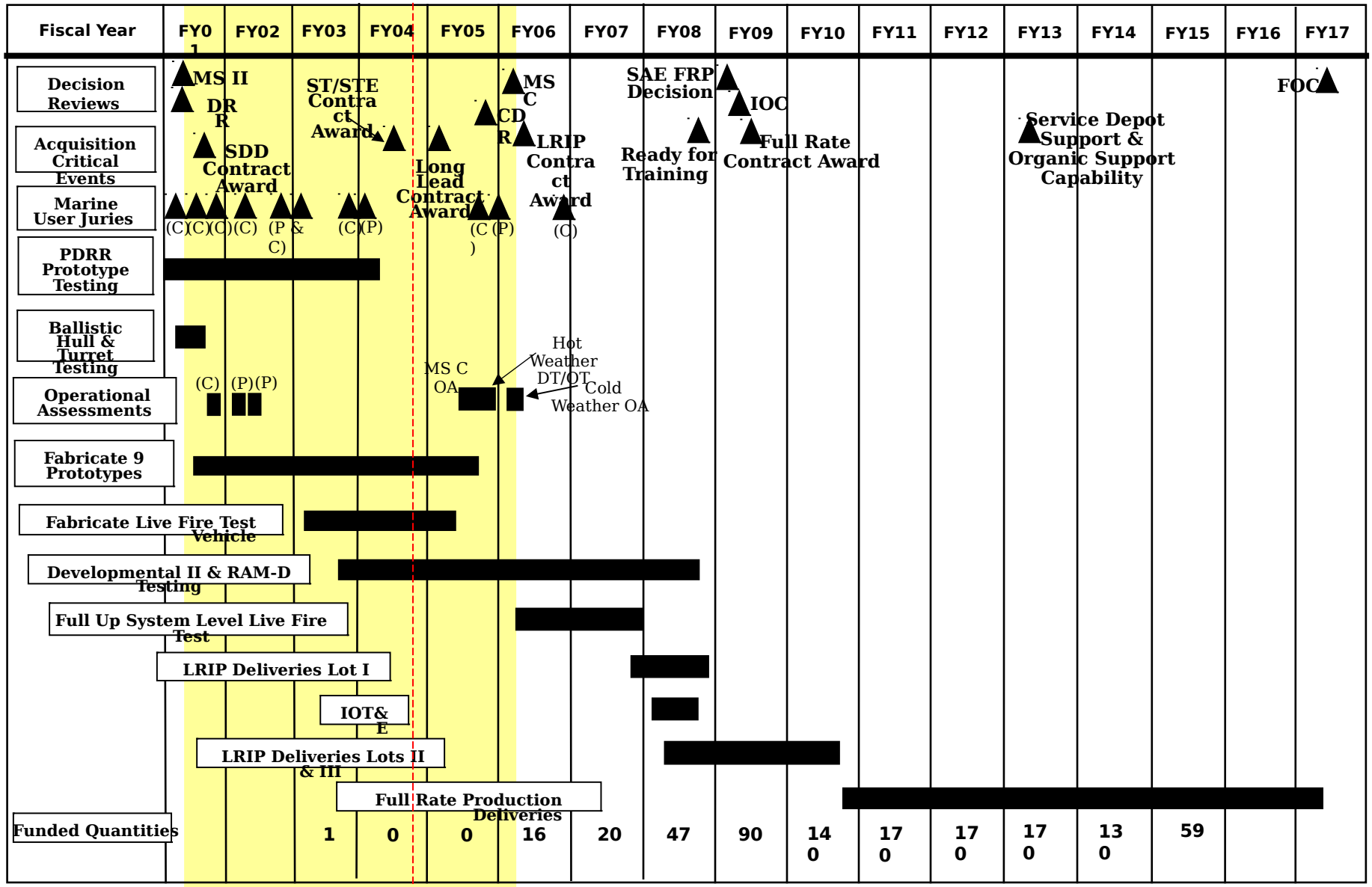
LPP 1

LZ
HAW
K

Special

EFV: EMW (OV-1)

EFV PROGRAM SCHEDULE



EFV C4I Integration

An Open Systems Approach

- **Challenges**
  - EFV must perform under extreme environmental conditions (heat/cold/shock/vibration/seawater/NBC, etc.).
  - C4 System requirements
    - Pace of change
    - Hardware/software development
- **Approach**
  - Open systems architecture contractually and technically directed
  - Host fielded C2 Systems
    - AFATDS, IOS, C2PC, SINCGARS, Antennas, PSC-5D, EPLRS, VIC-3, Meshnet, etc.
  - Use of COTS boards via implementation of Spraycool technology
  - Planned COTS refresh every 3 years for C4 HW
  - EFV open system architecture approach facilitates integration within the NCES (GIG) operational concept.
  - EFV software development is accomplished through COTS products.
    - Rational SW Development Tool
      - MPA, FC
    - Windows OS
      - DPU, CDP
    - Visual Basic
      - GUI development (C&D)

Spray Cool

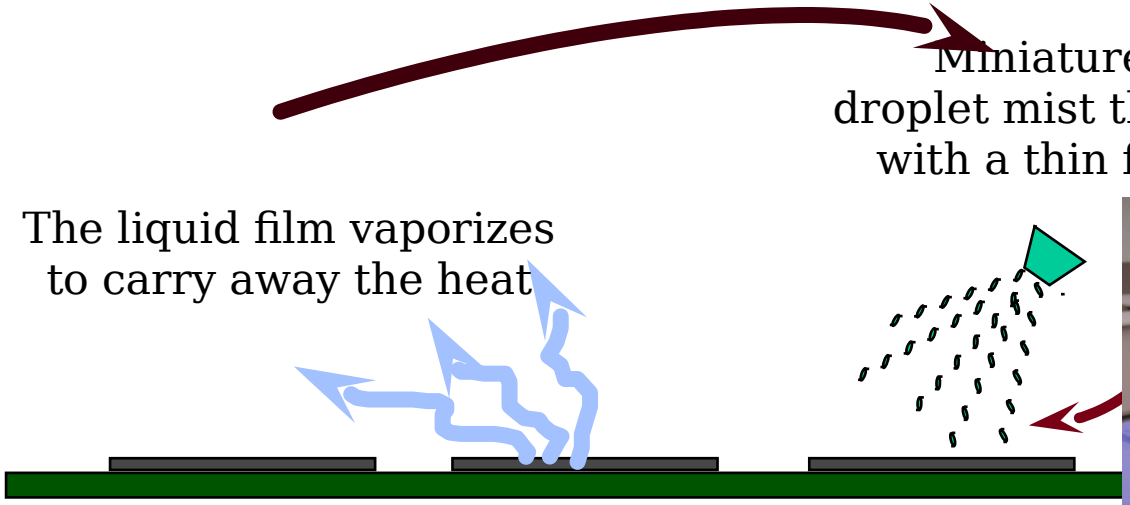
An Open Systems HW Solution

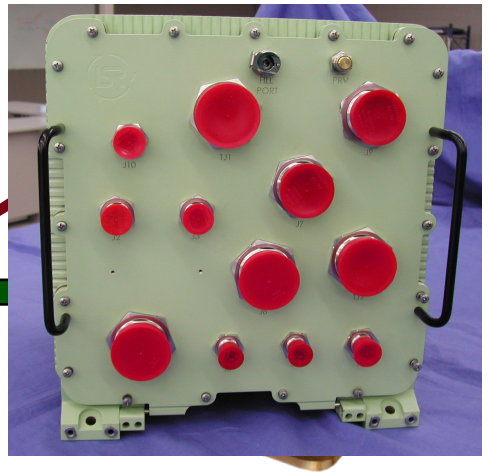
Spray cooling is the most efficient form of heat transfer!

The vapor is then condensed in an ambient heat exchanger
that is optimized for the specific environment
and the liquid is pumped back to the atomizers in a closed-system

Miniature Atomizer create a fine
droplet mist that coats the electronic
with a thin film of dielectric liquid

The liquid film vaporizes
to carry away the heat





Spray Cool is an SBIR activity that has transitioned to Phase III

EFV SDD Spray Cool MPU

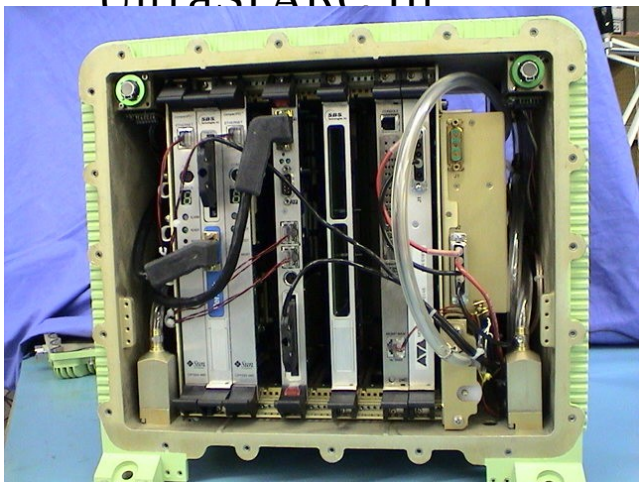
9-Slot cPCI

AFATDS Server - V6.3.2 (Solaris 2.7)

- SUN CP-1500 440MHz UltraSPARC IIi
- SBS Technologies CP-613 carrier board
  - Raytheon SP-TCIM/TACLINK 3000
  - Leutrek PMC Video Card

IOS Server - V3.6 (Solaris 2.5.1)

- SUN CP-1500 440MHz UltraSPARC IIi



TDN/C2PC/Video Server - V5.9.0.4 (Windows NT)

- Teknor Dual Pentium 700 MHz SBS Technologies
  - Raytheon SP-TCIM/TACLINK 3000
- CP-613 carrier board
  - Leutrek Vision Inc. PMC Video Capture Card
  - SBS Technologies MIP Serial Octal Card
- Performance Technologies Ethernet Switch

Dimensions:
15.0 W × 13.6 H × 13.2 D (inches)
Weight: 75 lbs

MOSA PART Validation

OSJTF's Expected Feedback from EFV

- **MOSA PART answers, rationale, explanations**
- **Mechanism Feedback**
  - How user-friendly/intuitive is the tool?
  - How well do the instructions explain the proper use of the tool?
  - How long did it take to complete the questionnaire?
- **Content Feedback**
  - How well do the questions provide an appropriate level of detail/coverage for a valid assessment of your MOSA?
  - How well does the supporting criteria provide additional insight into the questions and the expected level of detail for your rationale & explanations for each question?
  - How well do the questions match their corresponding sections?
  - How well does the assessment summary report provide a clear understanding of your score?

EFV Observations
MOSA PART Review

- The PART questions, even though broken into business and technical areas, are reiterative.
  - Supporting EFV documentation to support OSA implementation are used between the areas, e.g. SOW, S/SS, AMP/ASR.
- The explanation against each question is adequate and informative, but only provides a “pop-up” guidance against the “Very Large Extent” entry.
  - Understanding that even with supporting data, the questions are subjective, further clarity is needed to note what differentiates “To Some Extent ” To a Large Extent” entries.
- The interface was unwieldy.
  - A “locking” of the Question column would allow the respondent to quickly refer to the question, remarks and supporting data columns simultaneously.
- To be effective the PART must be injected in the early stages of design/programmatic activity.
  - As programs get closer to LRIP design, a directed MOSA implementation may be too costly or may impact schedule. Instead of helping, an implementation of MOSA activity my be detrimental.
- In the overview of the PART, it is noted that the program allows for adjustment of the assessment weighting.
  - Prior to starting the review process the program and the MOSA team must determine together the weighting factors prior initiating the PART review
- The actual man hours to complete the PART: @ 20-30 hours

Results of EFV MOSA Assessment

Rating – "Satisfactory" MOSA Implementation

Strong Points

- MOSA planning evidenced by proper MOSA language in the Program Acquisition Strategy
- Assigning the MOSA implementation responsibility to an IPT
- Inserting proper MOSA language in the EFV contracting documents
- Emphasizing the use of modular design approaches

Room For Improvement

- Providing evidence of the use of open standards for key interfaces, and
- Ensuring that the standards used in the modules connected by such interfaces conform to widely-supported and consensus-based standards

Recommendations

- Program should verify and document the existence of open standards for key system interfaces through appropriate mechanisms such as:
  - Conformance testing, and
  - Substitution of system components with similar components from competitive sources